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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/695,057	10/28/2003	Qing Deng	15436.170.1	5980
22913 7590 12/20/2006 WORKMAN NYDEGGER (F/K/A WORKMAN NYDEGGER & SEELEY) 60 EAST SOUTH TEMPLE 1000 EAGLE GATE TOWER SALT LAKE CITY, UT 84111			EXAMINER VAN ROY, TOD THOMAS	
			ART UNIT 2828	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE			MAIL DATE	
3 MONTHS			12/20/2006	
			DELIVERY MODE PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

# Office Action Summary

Application No.

10/695,057

Applicant(s)

DENG ET AL.

Examiner

Tod T. Van Roy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 11 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,5-7,11-13,16,24 and 27-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,5-7,11-13,16,24,27-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/11/2006 has been entered.

### ***Response to Amendment***

The examiner acknowledges the amending of claims 1, 11-13, 16, and 24, cancellation of claims 2-4, 8-10, 14-15, 17-23, and 25-26, and the addition of claims 27-33.

### ***Response to Arguments***

Applicant's arguments, see Remarks, filed 10/11/2006, with respect to the USC 112 rejection of the limitations of previous claim 26 have been fully considered and are persuasive. The rejection of the claim has been withdrawn.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 5-7, 11-13, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Young et al. ("Enhanced Performance of Offset-Gain High-Barrier Vertical-cavity Surface-Emitting Lasers", dated June 1993, IEEE Journal of Quantum Electronics Volume 29, Number 6, pages 2013-2022, by D.B. Young J.W. Scott F.H. Peters, M.G. Peters, M.L. Majewski B.J. Thibeault, Scott W. Corzine, and Larry A. Coldren) in view of Kasper et al. (US 5740191) and further in view of Ono et al. (US 6822984).

With respect to claims 1, and 6, Young teaches a vertical cavity surface emitting laser module, the module comprising: a vertical cavity surface emitting laser (fig.16 VCSEL) that has a predetermined (abs., pg.2 col.1 para.1) operating temperature that corresponds with desired operational characteristics of the VCSEL, wherein the vertical cavity surface emitting laser is tuned such that the predetermined operating temperature is higher than a room temperature (pg.8 col.2 para.2, 40-45C), a temperature sensor (fig.16, thermistor); and a heating element (fig.16 Peltier). Young does not teach the heating element to be configured to transfer heat to the VCSEL when the temperature sensor senses a temperature measurement that is below an activation value, wherein

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the predetermined value is determined in relation to a current of the vertical cavity surface-emitting laser. Kasper teaches a laser package including a heated laser diode (abs.) configured to turn on when the temperature sensor senses a temperature measurement that is below a predetermined value, wherein the predetermined value is determined in relation to an optimal operating temperature of the semiconductor laser (abs.). Ono teaches a laser package including a temperature control for a laser diode wherein the temperature control is based in relation to a current of the diode (col.2 lines 23-32, based on photodiode current, which is directly related to the output of the laser diode, and hence the current applied to the diode). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser module of Young with the temperature control of Kasper in order to avoid deleterious low temperature effects (Kasper, col.1 lines 42-46) and maintain the higher optimal operating temperature of the laser device regardless of the room temperature, and to use the current monitoring of Ono in order to use feedback directly related to the present operating conditions of the laser diode.

With respect to claim 5, Young, Ono and Kasper teach the laser module outlined in the rejection to claim 1, and Young further teaches that at the predetermined operating temperature a cavity resonance point of the VCSEL is substantially aligned with a gain peak bandwidth (pg.2 col.2 para.2, fig.3 (b)) of the VCSEL.

With respect to claim 7, Young, Ono and Kasper teach the laser module outlined in the rejection to claim 1, and Young further teaches the use of a Peltier device as the heating element. Young does not teach the use of a resistive heating element. Kasper

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teaches a laser package including a heated laser diode (abs.) that is heated using a resistive heating element (col.2 lines 14-26). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the Peltier device of Young with the resistive heating element of Kasper as the use of resistive heating elements is widely recognized in the art, and are simple and economical to utilize.

With respect to claim 11, Young, Ono and Kasper teach the laser module outlined in the rejection to claim 1, and Young further teaches a vertical cavity surface emitting laser (fig.16 VCSEL) that has a predetermined operating temperature, wherein the vertical cavity surface emitting laser is tuned such the optimal operating temperature is higher than a room temperature (pg.8 col.2 para.2, 40-45C).

With respect to claims 12 and 13, Young, Ono and Kasper teach the laser module outlined in the rejection to claim 1, including the device having been optimized to between 40-45C and operable to up to 145C (pg.8 col.2 para.2). Young, Ono and Kasper do not teach the predetermined operating temperature to be greater than 50C or 70C. It would have been obvious to one of ordinary skill in the art at the time of the invention to adjust the optimal operating temperature to any desirable level using the techniques of Young in order to suit the environmental conditions the given device was to be operated at (the optimal range of Young was chosen as an example, not as an exclusive range, as noted by the teaching of the device being operable to about 145C, therefor it would be within the general skill of a worker in the art to chose the most suitable range for the application).

With respect to claim 16, Young, Ono and Kasper teach the laser module outlined in the rejection to claim 8, and Kasper further teaches turning the temperature off when the chosen the predetermined operating temperature is exceeded (col.2 lines 23-26, col.4-5 lines 67-2). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser module with the function of turning the heating element off when the optimal temperature is exceeded to maintain the temperature range which would lead to the best output power and device efficiency.

Claims 24, and 27-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Young in view of Kasper and further in view of Prescott (US 2003/0033819)).

With respect to claim 24, Young teaches a vertical cavity surface emitting laser module, the module comprising: a vertical cavity surface emitting laser (VCSEL) (fig.2), a temperature sensor that senses an operating temperature of the VCSEL (fig.16 thermistor); a heating element in thermal communication with the VCSEL (fig.16 Peltier) and a control module (fig.16 temp feedback control). Young does not teach the control to operate in either a first temperature change = drive current change, or a second, temperature change = thermal output change, mode, or the control module to select the mode requiring the least amount of energy. Kasper teaches a laser package including a heated laser diode (abs.) configured to turn on when the temperature sensor senses a temperature measurement that is below a predetermined value, and a drive current mode that controls the drive current based on the temperature change (col.3 lines 35-40). Prescott teaches a laser temperature control wherein it is taught that the energy

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needed to drive the diode must be compared with the energy needed to drive the thermal management device ([0005]). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser module of Young with the temperature control of Kasper in order to avoid deleterious low temperature effects (Kasper, col.1 lines 42-46) and maintain the higher optimal operating temperature of the laser device regardless of the room temperature, as well as to select the mode requiring the least amount of energy in order to avoid potential thermal runaway (Prescott, [0005]) as taught by Prescott.

Claims 27-33 are rejected for the same reasons given in the rejections to claims 5-7, 11-13, and 16 respectively.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

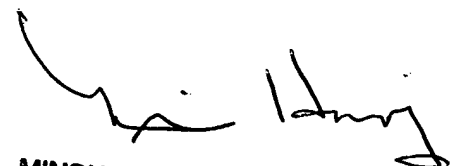
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVR



**MINSUN OH HARVEY  
PRIMARY EXAMINER**